

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 090 679 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**02.01.2004 Bulletin 2004/01**

(51) Int Cl.7: **B01F 13/10, B67D 5/46**

(21) Application number: **99203225.0**

(22) Date of filing: **04.10.1999**

(54) **Apparatus for dispensing viscous fluids**

Abgabevorrichtung für viskose Flüssigkeiten

Distributeur de liquides visqueux

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**

- Langeveld, Michiel Jacobus Johannes  
2724 EA Zoetermeer (NL)
- Mink, Johannes Hendrikus  
2215 GN Voorhout (NL)

(43) Date of publication of application:  
**11.04.2001 Bulletin 2001/15**

(74) Representative: **Metman, Karel Johannes  
De Vries & Metman  
Overschiestraat 180  
1062 XK Amsterdam (NL)**

(73) Proprietor: **Fluid Management  
Wheeling, IL 60090-5776 (US)**

(72) Inventors:  
• **Post, Johannes Hermanus Nicolaas  
2171 DX Sassenheim (NL)**

(56) References cited:  
**EP-A- 0 372 460 EP-A- 0 800 858  
GB-A- 2 060 563 US-A- 4 323 097  
US-A- 4 878 601**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

the connector in order to exchange containers.

**[0024]** Fig. 9 is an explosive view of the actuator of fig. 6-8, on a larger scale.

**[0025]** Fig. 10 a-e are sectional views corresponding to fig. 7 illustrating the operation of the actuator through five different positions.

**[0026]** The drawings show an apparatus for dispensing viscous fluids, such as hair dye contained in containers, in particular flexible packages or bags 1. The apparatus is used to mix dosages from several packages 1 in order to create a hair dye of a particular recipe. In order to obtain an accurate mixture of hair dye from several containers each containing a certain dye colour, it is necessary that the apparatus is able to dispense the fluid in an accurate way.

**[0027]** The apparatus according to the invention comprises a horizontal turntable 2 rotatable about a vertical axis. The turntable 2 does not have a shaft in the centre of the table, but is supported by support rollers 3, 4 (fig. 3), the rollers 3 thereof being fixed and being only rotatable, whereas the rollers 4 are journaled on a slide which can be moved to and fro the rollers 3. The object thereof is to engage the circumference of the turntable 2 in order to support it in axial and radial direction, or to disengage from the turntable in order to release it for demounting purposes. In principal it would also be possible to have only three rollers, one or two of which being moveable.

**[0028]** In this case, the turntable 2 is adapted to contain twenty packages 1 spaced around the circumference of the turntable 2. For each package 1 there is provided a connector 6 having a nipple 7 adapted to frictionally engage into an opening of the package. For this purpose, the flexible package 1 has a rigid dispensing portion 8 through which a dispensing opening 9 extends and which may engage around the nipple 7. The dispensing portion 8 includes a flat flange 10 at its free end and this flange 10 may be inserted into a space 11 in a holder 12 of the connector 6. A slit 13 is provided to allow passage of the neck of the dispensing portion 8 of the package 1. It will be described later on how the nipple 7 and dispensing opening 9 of the package 1 are connected to each other. The dispensing portion 8 of the package 1 is connected to a storage portion 14 of the package 1. Such storage portion 14 is made of plastic foil and may be kept upright on the connector 6 by means of a bottom support 15 and side supports 16 of the connector 6. The side of the storage portion 14 of the flexible package 1 resting on the bottom support 15 and the opposite side of the package 1 is such that there are no dead spaces where fluid will be left as residu. During tests a residu of maximally 1% remained within the package 1 after emptying it.

**[0029]** Fig. 1, 4 and 5 show a pumping arrangement 17 connected to each connector 6 and adapted to suck fluid from the respective package 1 and to press it out in order to dispense the fluid in an accurate dosage. The pumping arrangement 17 including a piston pump com-

prising a cylinder 18 as dosing reservoir and a piston 19 adapted to reciprocate within the cylinder 18 and being guided and controlled by a piston rod 20 carrying a driving lip 21 at its free end adapted to be engaged by a drive means to be described later on.

**[0030]** The cylinder 18 of the pumping arrangement 17 is connected to the nipple 7 of the connector 6 through a valve block 22. A pin shaped valve body 23 is slideably arranged within the valve block 22 and is slideable between a first position (fig. 4a, 4b) opening a suction channel 24 and closing a dispensing channel 25, and a second position (fig. 4c, 4d) in which the valve body 23 closes the suction channel 24 and opens the dispensing channel 25. The valve and channel arrangements are of conventional design.

**[0031]** The valve body 23 is operated by means of a control lever 26 which is pivotable around a horizontal pivot 27 and slideably engages with its forked end a pin 28 attached to the valve body 23 and extending through a vertical slot 29 in the valve block 22. The pin 28 engages in slots 30 on either side of the valve block 22 allowing movement between the control lever 26 and the pin 28 during vertical displacement of the pin 28 to move the valve body 23 to and fro the first and second positions. The end of the control lever 26 remote from the pin slot connection 28, 30 can be engaged by a gripper of an operating means which will be described hereafter.

**[0032]** Fig. 5 shows the operating means for the valve body 23 and pumping arrangement 17, the operating means including a linearly movable pump gripper 31 driveable by means of a drive spindle 32, and a rotatable valve gripper 33 which is rotatable around a horizontal pivot 34 and is driven by a crank mechanism 35. A the crank shaft 36 of the crank mechanism 35 cooperates with a sensor 37 to determine the beginning and end of the stroke of the gripper 33. The beginning and end of the stroke of the crank mechanism 35 are near the top and bottom dead centre of the crank mechanism 35 so that small variations in the start and end positions of the crank shaft have minimal effect on the start and end positions of the valve gripper 33.

**[0033]** The operation of the valve and pumping arrangements is as follows.

**[0034]** If the computer of the apparatus has determined the dosage of a fluid to be dispensed from a particular package 1, the turntable is rotated by its drive means until the respective package 1 is positioned in line with the operating means. The grippers 31 and 33 thereof come into engagement with the driving lip 21 and the end of the control lever 26, respectively. The piston 19 and valve body 23 are in the positions according to fig. 4a. Depending on the dosage to be dispensed, the piston 19 is displaced by the pump gripper 31 to the extent that the dosage to be dispensed is sucked into the cylinder 18 which serves as dosing reservoir.

**[0035]** In fig. 4b, the piston 19 has been moved to its maximally displaced position so that the whole cylinder has been filled with fluid. Then, the valve gripper 33 is

ring 41 has come into engagement with the toothing of the toothed rack 42 of the connector 6 and the pins 56 have left the slot portion 57' and have arrived in the concentric slot portion 57" of the curved slot 57, so that the pins 56 would now be able to perform a circular motion around the inner shaft 55.

[0043] In Fig. 10b, the handle 39, 47 is now able to rotate around the shaft 55 which is in the center of the handle and in the center of curvature of the slot portion 57". The handle 39, 47 will rotate relative to the toothed ring, thereby tensioning the torsion springs 48, until the pin 50 in the shaft 49 has reached the end wall of slot 51 in the toothed ring 41. The protruding part of the toothed ring 41 facing away from the toothing is now released from the wall of the housing 43, so that the toothed ring is now able to follow the rotation of the handle 39, 47.

[0044] From the position of fig. 10b to the position of fig. 10e, the shaft 46 and, through the pin 50 engaging the end wall of slot 51, the toothed ring 41 are rotated with the handle 39. Due to the engagement between the toothed rack 42 and the toothed ring 41, the connector 6 is moved upwardly to such an extent that the nipple 7 is disengaged from the dispensing opening 9 of the flexible package 1 so that this flexible package 1 which is empty may be removed and may be replaced by a full package. This is then engaged with its dispensing opening 9 over the nipple 7 by moving the handle 39 back to the position of fig. 10a. Due to the engagement of the nipple 7 into the dispensing portion 8 of the package, it pushes away a self-closing valve of the package, so that the package opens and closes automatically upon displacement of the nipple into or out of the dispensing portion 8 of the package 1.

[0045] The invention is not restricted to the embodiment shown in the drawing and described herein before, which may be varied in different manners within the scope of the invention.

[0046] For example, the handle may be replaced by a motor drive, such as an electric, pneumatic or hydraulic motor.

## Claims

1. Apparatus for dispensing viscous fluids, comprising:

a turntable (2) rotatable around an axis of rotation;  
a plurality of containers (1) containing the fluid to be dispensed and connected to the turntable in positions spaced about the circumference of the turntable;  
a plurality of pumps (17) each being associated with one of the said containers for dispensing fluid therefrom and attached to the turntable, the pumps having connectors (6) for releasably

connecting the containers to the pumps;

characterized by a stationary actuator (38) positioned at the circumference of the turntable (2) and being movable to and fro a first inoperative position disengaged from the turntable, a first operative position in engagement with one of the connectors (6), in which the connector is connected to the respective container (1), and a second operative position, in which the connector (6) is disengaged from the container (1) and the container may be removed and exchanged for another container.

2. Apparatus according to claim 1, wherein the movement of the actuator (38) to and fro the inoperative position and the first and second operative positions is done by one continuous manipulation of an actuating element (39), such as a handle or motor.
3. Apparatus according to claim 2, wherein the connector (6) is provided with a toothed rack (42) and the actuator (38) is provided with a toothed ring (41), and wherein the toothed ring (41) and the actuating element (39) are coupled through a transmission mechanism (40) transmitting a substantially continuous movement of the actuating element (39) into a consecutive translating and rotating movement of the toothed ring (41).
4. Apparatus according to claim 3, wherein the transmission mechanism (40) comprises a shaft (49) fixed to a stationary support, a slotted hole (52, 53) in the actuating element (39) and the toothed ring (41) through which the shaft (49) extends, the length of the slotted hole (52, 53) being such that when the shaft is at a first end of the slotted hole, the toothed ring (41) is out of engagement with the rack (42) of the connector (6) and when the shaft is at the second end of the slotted hole (52, 53) the toothed ring (41) is in engagement with the rack (42) of the connector (6), the toothed ring and the support being further connected through a pin-slot connection (56, 57), the slot (57) having at least two segments, a first segment (57') dictating the translatory movement of the toothed ring and a second segment (57") dictating the rotary movement of the toothed ring.
5. Apparatus according to claim 4, wherein the actuating element (39) and the toothed ring (41) are rotatable with respect to each other to a limited extent and are coupled by means of a torsion spring (48).
6. Apparatus according to one of the preceding claims, wherein the connector (6) includes a nipple (7) which is insertable into an opening (9) of the container (1), the nipple being slidable in longitudinal direction of a holder (12), the holder being provided

6. Vorrichtung nach einem der vorangehenden Ansprüche, wobei der Anschluss (6) einen Nippel (7) beinhaltet, der in eine Öffnung (9) des Behälters (1) einsetzbar ist und in Längsrichtung eines Halters (12) gleitbar ist, welcher Halter mit einem Schlitz (13) versehen ist, der sich in Querrichtung des Halters (12) erstreckt, um einen Flansch (10) des Behälters (1) zu dem Halter (12) einzuführen und ihn daran zu befestigen, wobei die Öffnung (9) mit dem Nippel (7) ausgerichtet ist. 5
7. Vorrichtung nach einem der vorangehenden Ansprüche, wobei die Pumpen (17) auf der Seite des Drehtisches (2) vorgesehen sind, die der Seite gegenüberliegt, wo sich die Anschlüsse (6) befinden, wobei sich die Pumpen im wesentlichen parallel zu dem Drehtisch in radialer Richtung erstrecken. 10
8. Vorrichtung nach einem der vorangehenden Ansprüche, wobei der Drehtisch (2) drehbar mittels mehrerer Walzen (3, 4) gelagert ist, die mit dem Drehtisch an seinem Umfang im Eingriff sind und ihn in radialer und axialer Richtung lagern. 15
9. Vorrichtung nach Anspruch 8, wobei die mehreren Walzen (3, 4) zwei in ihrer Position fixierte Walzen (3) beinhalten und eine oder zwei bewegliche Walzen (4), die zu dem Drehtisch (2) hin und von ihm weg beweglich sind. 20
10. Vorrichtung nach einem der vorangehenden Ansprüche, wobei die Vorrichtung dazu ausgestaltet ist, mit flexiblen Paketen als Behältern (1) zusammen zu arbeiten, wobei der Drehtisch (2) mit Lagermitteln (15, 16) ausgestattet ist, um die Pakete in einer aufrechten Stellung in allen Entleerungsstufen zu halten. 25
11. Vorrichtung nach einem der vorangehenden Ansprüche, wobei die Pumpen (17) jeweils ein Ventil (23) beinhalten, das zwischen einer Position, in welcher die Pumpe Fluid aus dem Behälter in ein Dosierreservoir (18) saugen kann, und einer Position, in welcher die Pumpe (18) Fluid aus dem Dosierreservoir ausgeben kann, beweglich ist, welches Ventil mittels eines zentralen Greifers (33) betätigbar ist, der einen Betriebshub hat, dessen Enden durch Sensoren (37) bestimmt sind. 30

## Revendications

1. Appareil de distribution de fluides visqueux comprenant : 35

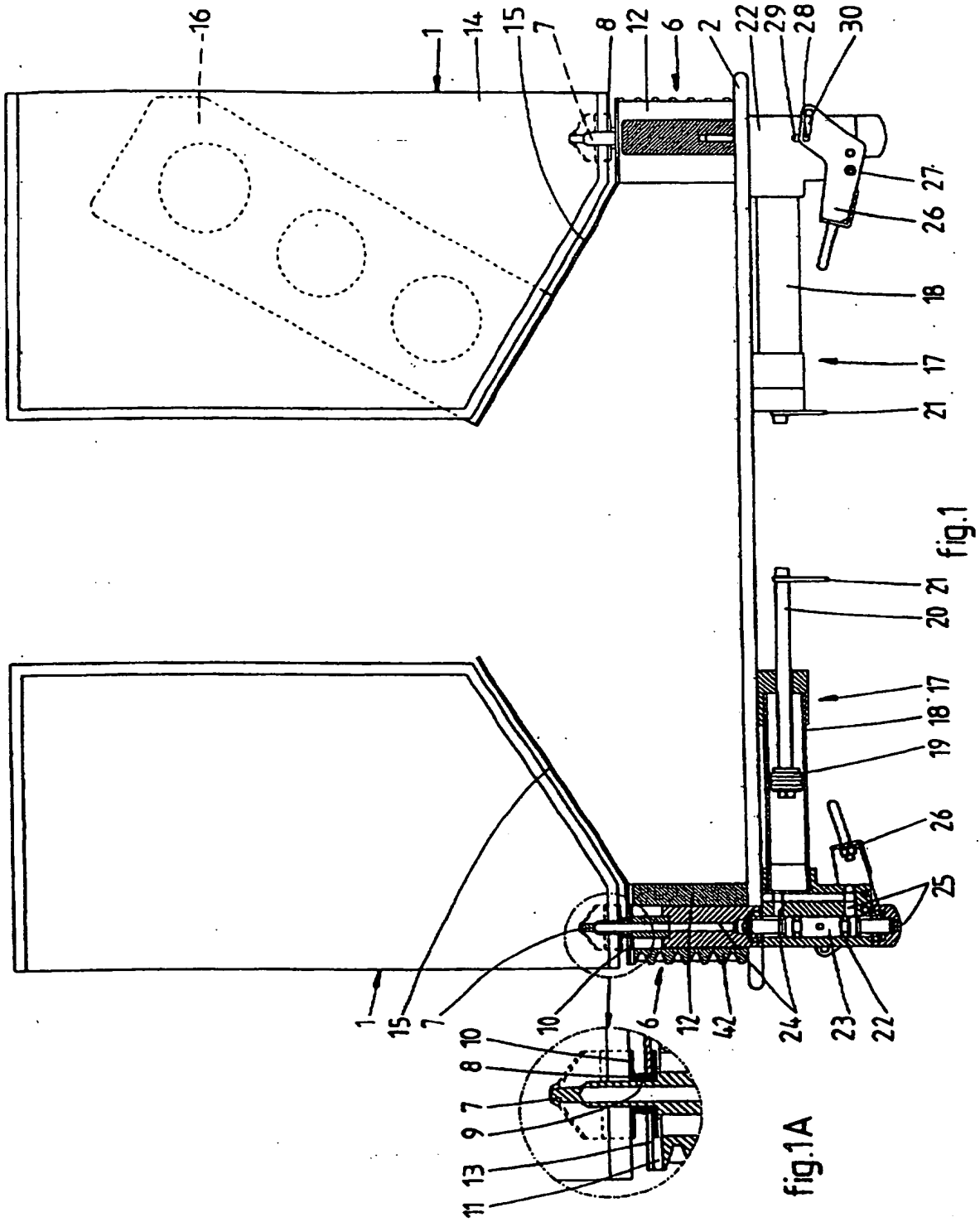
une table tournante (2) pouvant tourner autour d'un axe de rotation,  
une pluralité de récipients (1) contenant le fluide

de à distribuer et joints à la table tournante dans des positions espacées le long de la circonférence de celle-ci,

une pluralité de pompes (17) associées chacune à un des récipients pour en distribuer le fluide et fixées à la table tournante, ces pompes comportant des raccords (6) pour raccorder de manière détachable les récipients aux pompes,

caractérisé par un actionneur fixe (38) placé sur la circonférence de la table tournante (2) et mobile en va-et-vient entre une première position inactive dé-  
gagée de la table tournante, une première position active en prise avec un des raccords (6), dans laquelle le raccord est joint au récipient (1) respectif, et une deuxième position active, dans laquelle le raccord (6) est dégagé du récipient (1) et le récipient peut être enlevé et remplacé par un autre récipient.

2. Appareil selon la revendication 1, dans lequel le mouvement de va-et-vient de l'actionneur (38) entre la position inactive et les première et deuxième positions actives est effectué par une seule manipulation continue d'un élément d'actionnement (39) tel que poignée ou moteur. 40
3. Appareil selon la revendication 2, dans lequel le raccord (6) est pourvu d'une crémaillère dentée (42) et l'actionneur (38) est pourvu d'un anneau denté (41), et dans lequel l'anneau denté (41) et l'élément d'actionnement (39) sont accouplés par un mécanisme de transmission (40) qui transforme un mouvement sensiblement continu de l'élément d'actionnement (39) en un mouvement de translation et rotation consécutives de l'anneau denté (41). 45
4. Appareil selon la revendication 3, dans lequel le mécanisme de transmission (40) comprend un arbre (49) fixé à un support fixe, un trou rainuré (52, 53) dans l'élément d'actionnement (39) et l'anneau denté (41) par lequel passe l'arbre (49), la longueur du trou rainuré (52, 53) étant telle que lorsque l'arbre est à une première extrémité du trou rainuré, l'anneau denté (41) est hors de prise avec la crémaillère (42) du raccord (6), et lorsque l'arbre est à la deuxième extrémité du trou rainuré (52, 53), l'anneau denté (41) est en prise avec la crémaillère (42) du raccord (6), l'anneau denté et le support étant en outre joints par un joint broche-rainure (56, 57), la rainure (57) comportant au moins deux segments, un premier segment (57') qui dicte le mouvement de translation de l'anneau denté et un deuxième segment (57'') qui dicte le mouvement de rotation de l'anneau denté. 50
5. Appareil selon la revendication 4, dans lequel l'élément d'actionnement (39) et l'anneau denté (41) peuvent tourner l'un par rapport à l'autre dans une 55



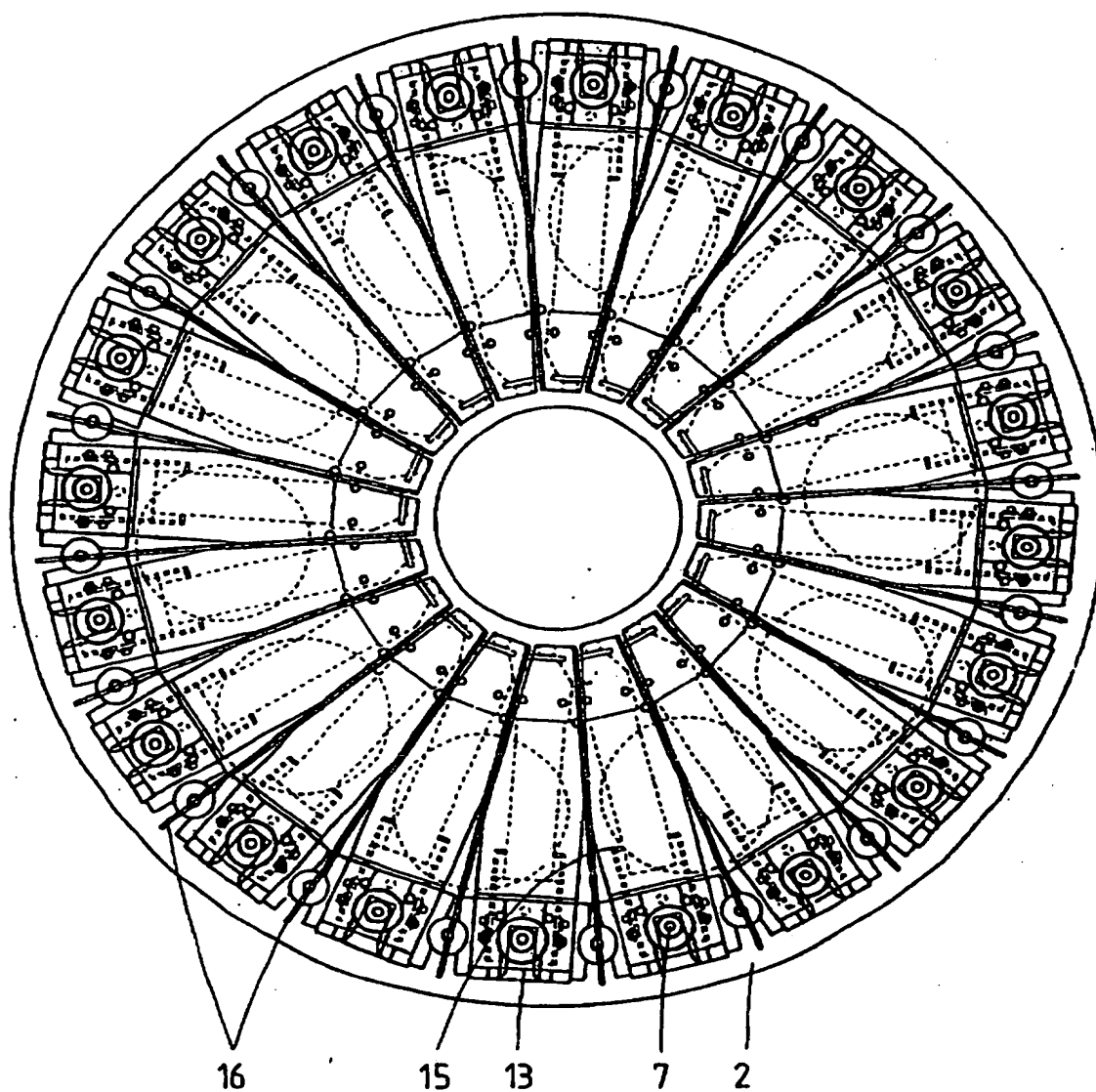


fig.2

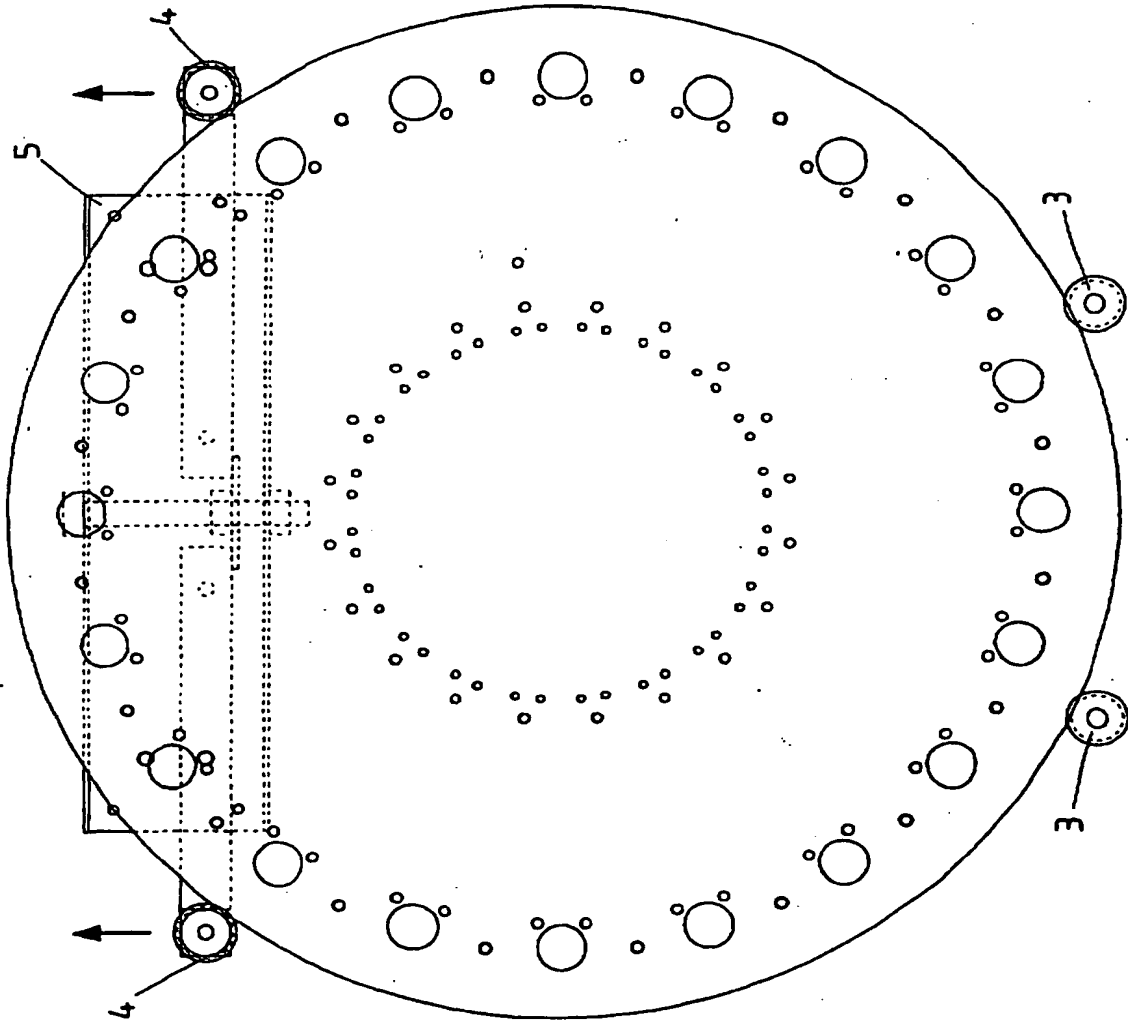
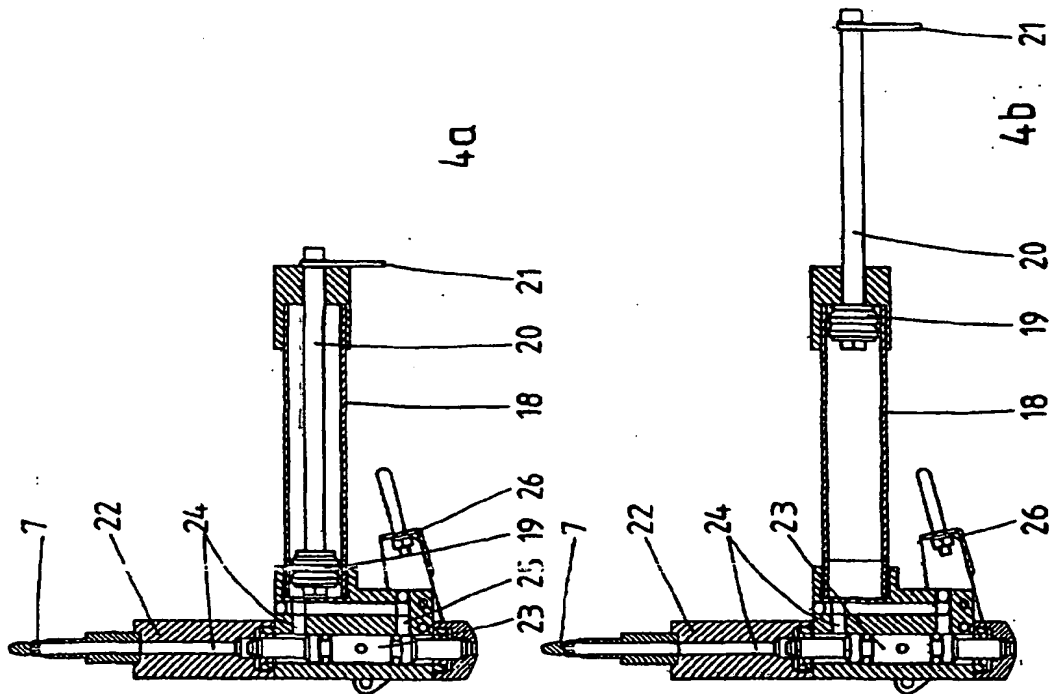
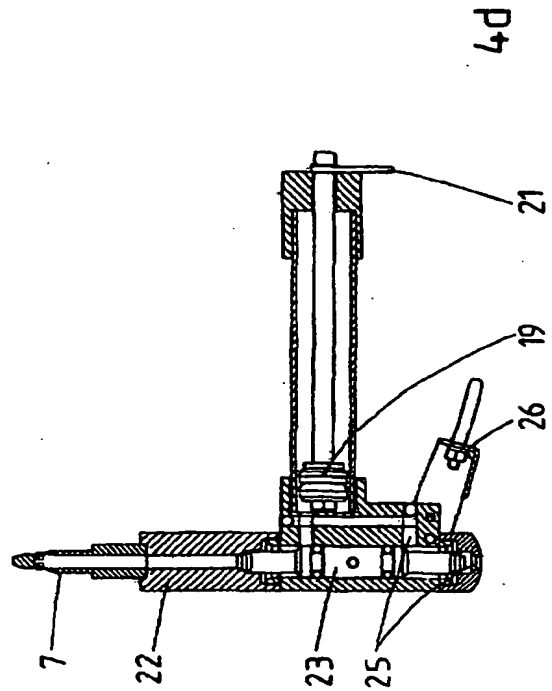
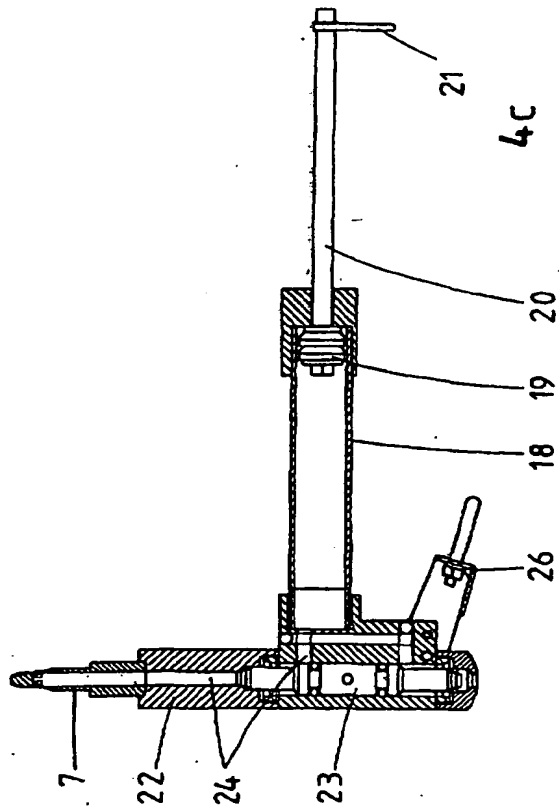


fig. 3



4a

4b

4d



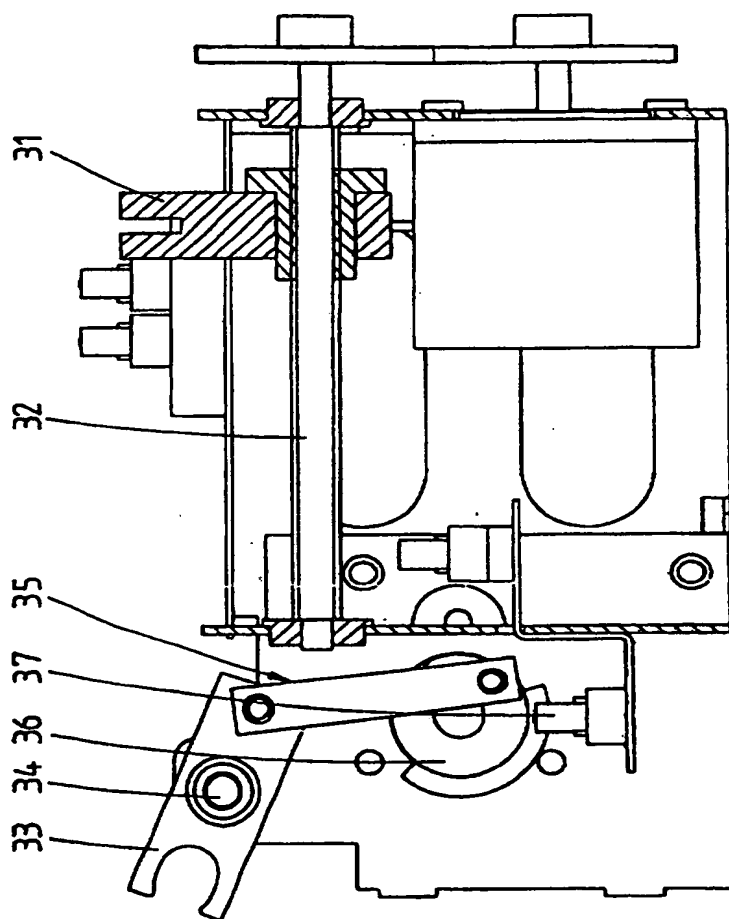


fig. 5

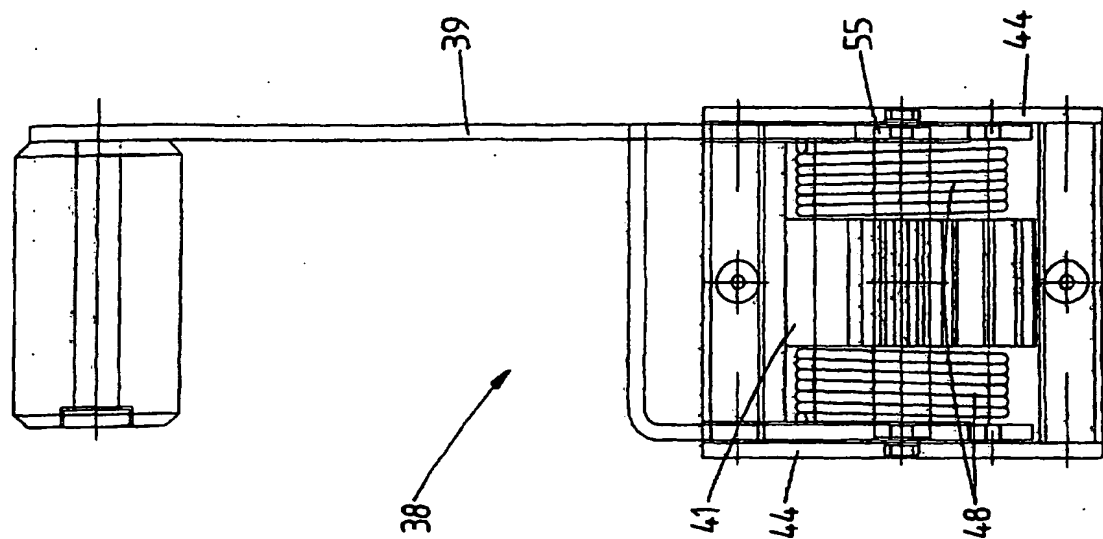


fig.8

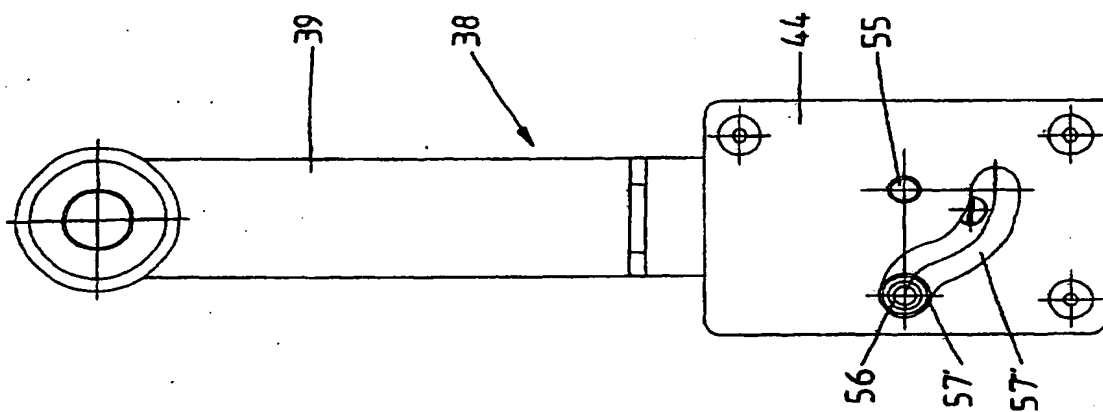


fig.6

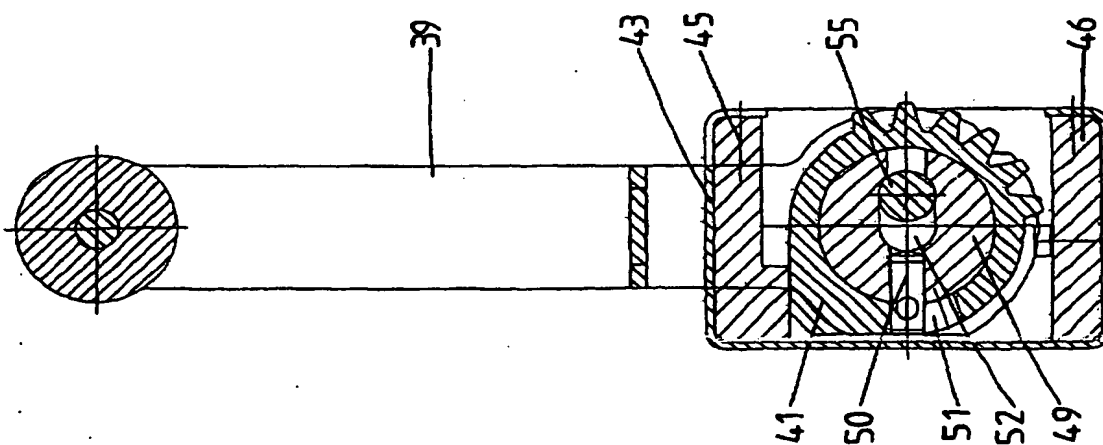


fig.7

BEST AVAILABLE COPY

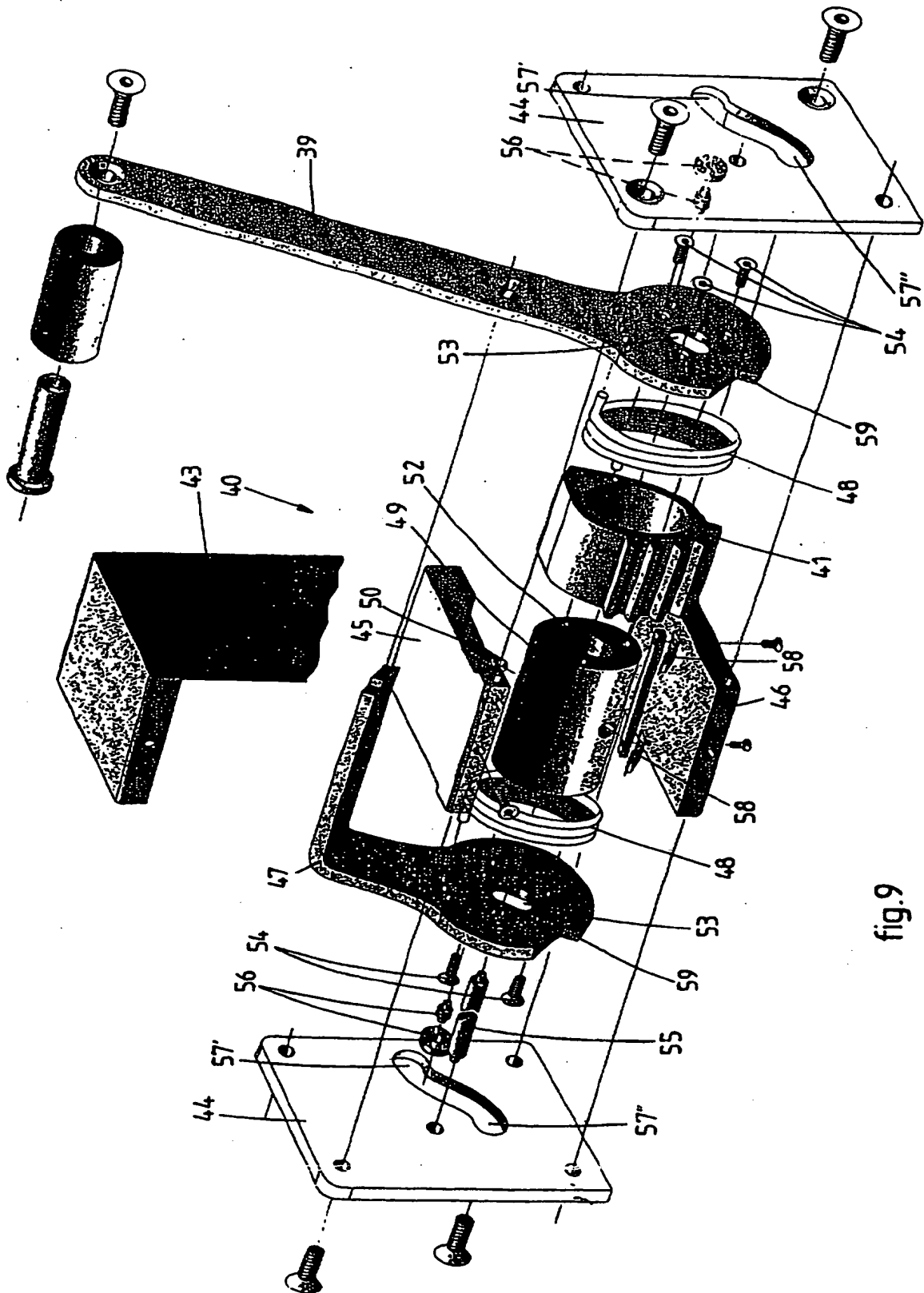


fig.9

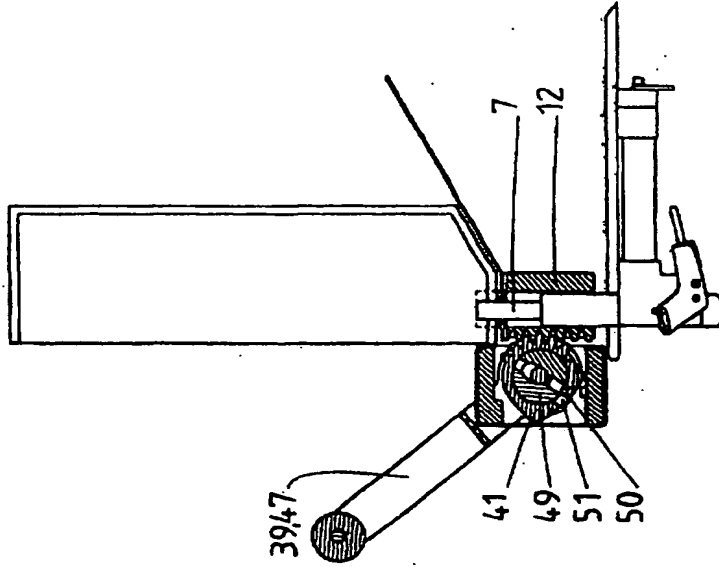


fig.10c

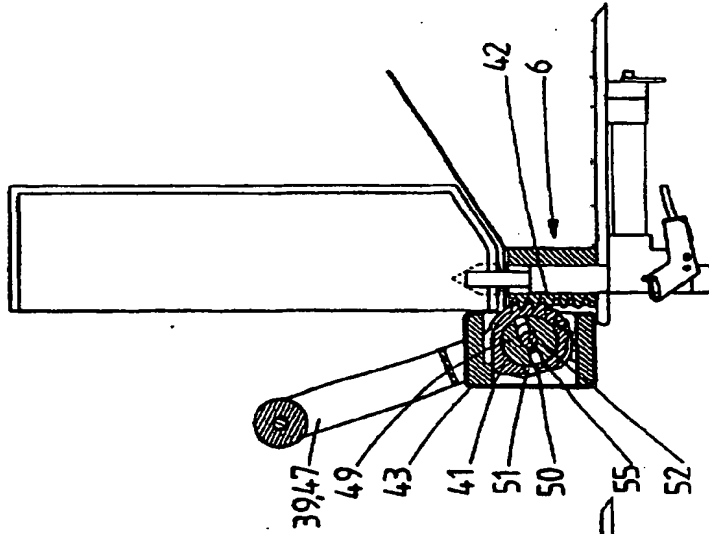


fig.10b

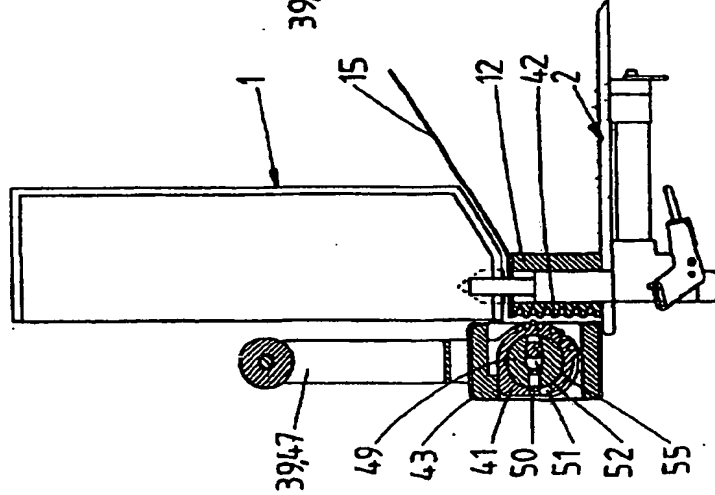


fig.10a

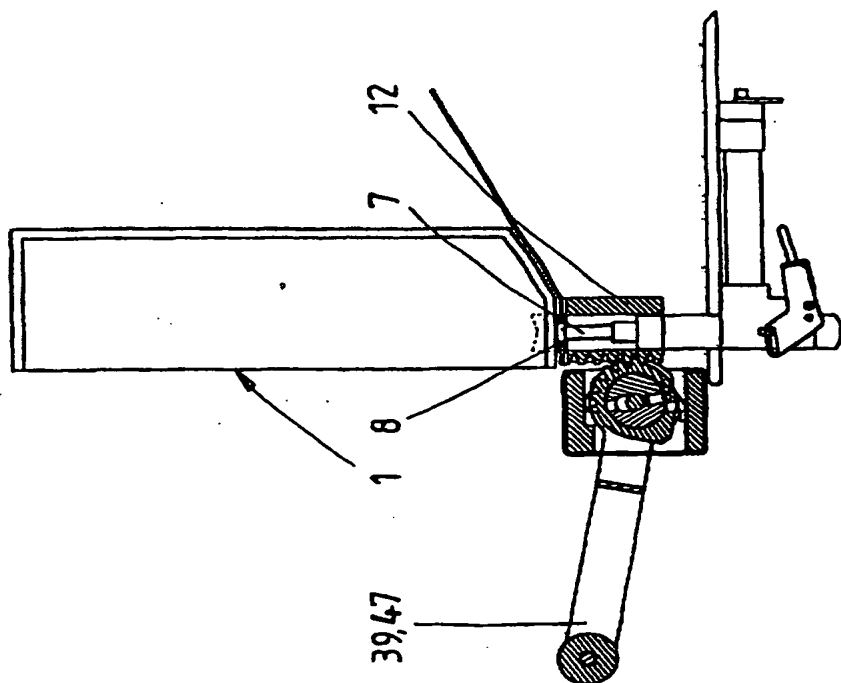


fig.10e

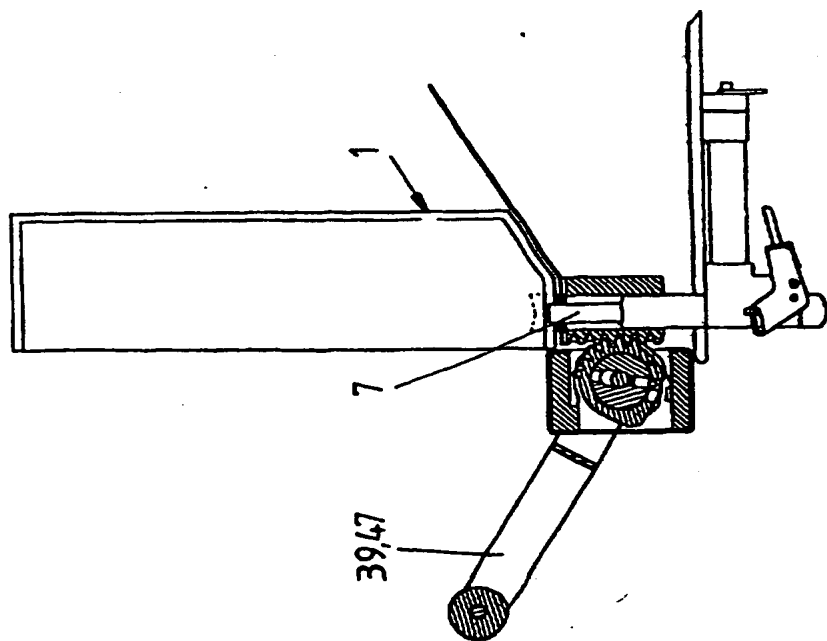


fig.10d